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**Heparin mimicking polymer promotes myogenic differentiation of muscle progenitor cells.**

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**Public Summary:**

**Scientific Abstract:**

Heparin and heparan sulfate mediated basic fibroblast growth factor (bFGF) signaling plays an important role in skeletal muscle homeostasis by maintaining a balance between proliferation and differentiation of muscle progenitor cells. In this study we investigate the role of a synthetic mimic of heparin, poly(sodium-4-styrenesulfonate) (PSS), on myogenic differentiation of C2C12 cells. Exogenous supplementation of PSS increased the differentiation of C2C12 cells in a dose-dependent manner, while the formation of multinucleated myotubes exhibited a nonmonotonic dependence with the concentration of PSS. Our results further suggest that one possible mechanism by which PSS promotes myogenic differentiation is by downregulating the mitogen activated extracellular regulated signaling kinase (MAPK/ERK) pathway. The binding ability of PSS to bFGF was found to be comparable to heparin through molecular docking calculations and by native PAGE. Such synthetic heparin mimics could offer a cost-effective alternative to heparin and also reduce the risk associated with batch-to-batch variation and contamination of heparin.

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